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No. XXI.

*Description of a Rolling Draw-Gate, as applied to Water-Mills. Invented and Communicated by Nathan Sellers.—
Read, April 19, 1811.*

BEING part owner of a saw-mill, working under a head and fall of about eighteen feet, by double geers, and finding the expense of repairs very considerable, it was agreed by the owners to remove the complex works, and to substitute the common flutter-wheel, which being more simple, would be less expensive and troublesome. This they intended to do, in the usual way, by bringing the water to the wheel by an open shoot placed nearly perpendicular under a head of about three feet; the gate or draw to be flat in the bottom of the head. But, as the power of the mill would be increased by extending a close head down to the wheel, I was very desirous that this should be done; and the only objection to it was the difficulty of starting the gate under so heavy a press of water—say about 14 feet. To remove or obviate this difficulty, was the subject of my frequent thoughts, and as the persevering labours of the human mind, to effect useful purposes, seldom fail, the following principle or method occurred, was adopted, and answered my utmost expectation.

The method will be best explained by a miniature model, which I have made, and herewith send to the Philosophical Society, at the request of one of their members. A drawing of this model is exhibited in Plate IX. fig. 2.

I call this invention a rolling draw-gate.

It consists of a roller, (which I recommend to be made of cast iron,) five or six inches diameter, well turned, with a gudgeon of about three inches long, and three inches diameter, at each end, and at one end a square of four or five inches extended beyond the gudgeon, to fit a lever on, for turning the roller when fixed in the head. As much of this roller as the length of the buckets in the water wheel, was cast but half a roller, *b*, so as to leave a flat side as broad as the diameter of the cylinder. The cylinder *b*, is to be fixed between the sides of the descending trunk or head, *a*, conducting the water down to the wheel, with its flat side towards the back of the trunk, and with its whole cylindrical ends and gudgeons let into the side planks, and the square-ended one passing through to receive the lever by which the roller is to be worked. When thus fixed, and when the flat side of the roller is parallel with the back of the descending trunk, it will leave an aperture of nearly half its diameter, for the water to pass. Then, by turning the roller so that the lower edge of the flat part approaches the back of the trunk, the aperture is lessened, and by turning it still further, the aperture is closed, by the said lower edge impinging on the back of the trunk in an angle of 40 or 45 degrees. Then to shut the bottom of the trunk so as to prevent the water from running on the other side, or behind the roller, a plank is fitted in grooves cut in the side planks of the trunk, and key'd so as to fit nicely on the cylindrical part of the roller, which, in turning, slides close in contact with the grooved edge of this bottom plank. The front planking of the descending trunk fits nicely on this bottom plank, which is kept up tight by keys underneath in the grooves cut in the side planks to receive the bottom plank. Being thus constructed, by turning the cylinder by means of the lever affixed to it, the aperture may be nicely regulated to the state

of the water or weight of the work—and this under a very great press of head, because it falls on the flat part of the cylinder equally on each side of the centre of motion, and has therefore as much tendency to shut the aperture as to prevent its being opened.

The society are at liberty to retain the model and use it as they see proper. Should any person wish to apply it, I have no objection, and if any advantage results from its application, it will give me pleasure.

NATHAN SELLERS.

Philadelphia, April 11, 1811.

Fig. 1.

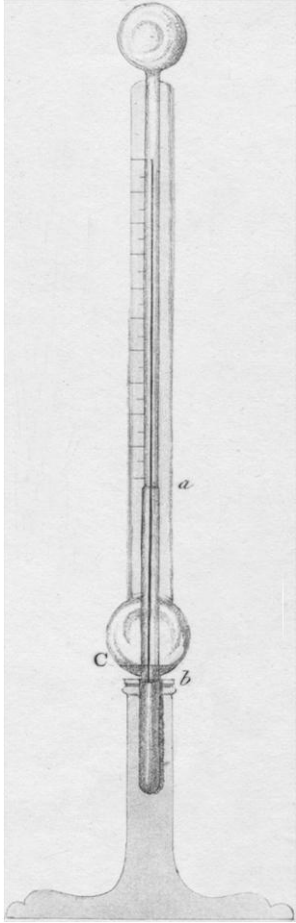


Fig. 2.

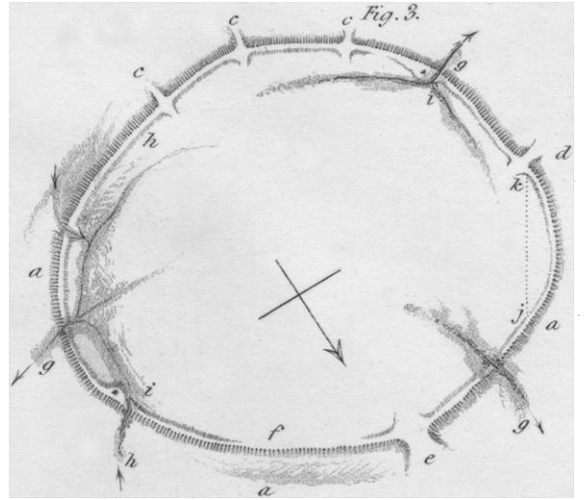
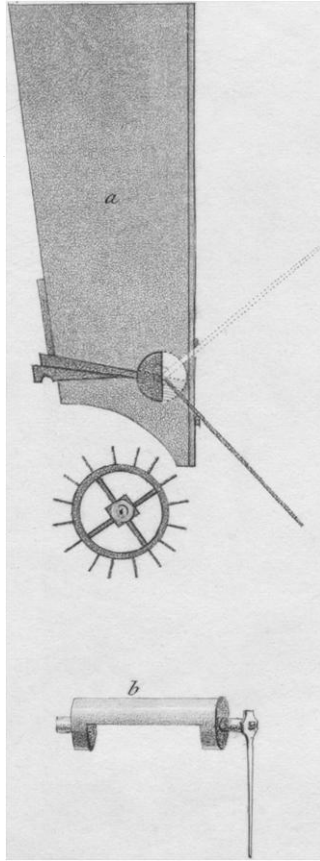


Fig. 4.

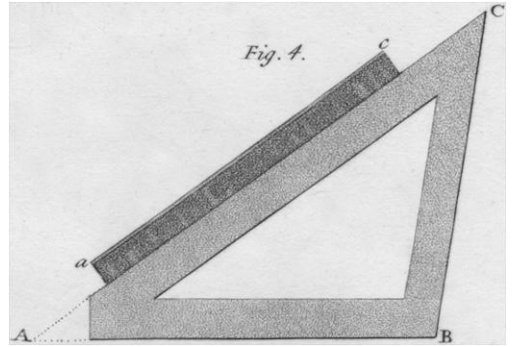


Fig. 6.

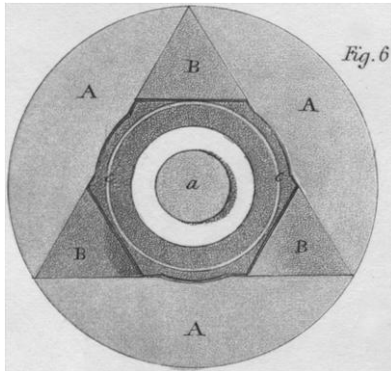


Fig. 5.

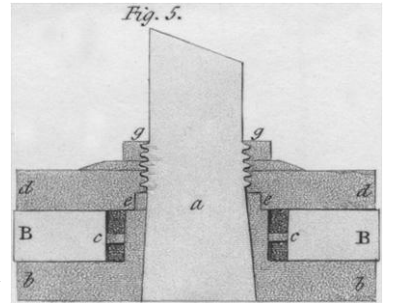


Fig. 8.

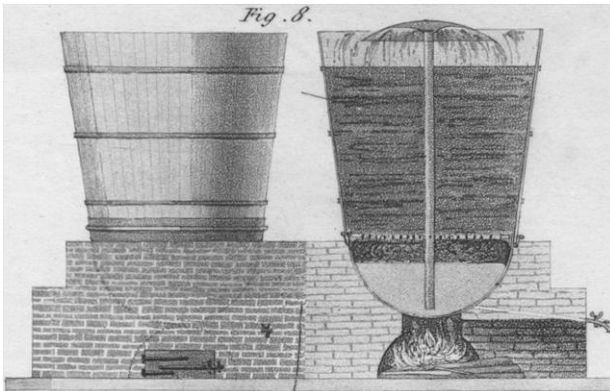


Fig. 9.

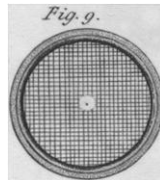


Fig. 7.

